other constituent of personal character, and the study of it must be ultimately personal."

This question of soil, then, is an element not to be disregarded, and associated with its adaptations in various directions are the questions of "*Predispositions in Disease*," the establishment of "*Diathesis in Disease*," "*Immunities from Disease*," &c.

Each one of these developments I touched upon in my last paper, and I endeavoured to shew by concrete examples, how marked adaptations could demonstrably be shewn to have taken place in various directions. of living cell elements *in* the body *to germs* outside.

It would have afforded me much pleasure to go more fully into this aspect of the matter to-night. Want of leisure, and shortness of time however force me to content myself with what I have said. In conclusion, let me hope that I have succeeded in making clear my views, and that I have supplied a few thoughts which are worthy the consideration of the members present.

Of necessity it is not possible to avoid technicalities in a communication of this sort, but I have tried to be as careful as possible to express in general terms my meaning. Whether I have in consequence appealed as forcibly to you as I should have liked is a subject of doubt to me. At any rate I shall, I hope, be credited with good intentions, and if I have excited even the smallest amount of interest I shall consider myself amply repaid for my slight trouble in preparing these notes.

ON FOSSIL PLANTS FROM INDWE AND CYPHERGAT COAL BEDS.

By Dr. John Shaw, F.L.S., &c.

Mr. R. W. Murray, of the *Cape Times*, handed over for my inspection specimens of shale from the coal beds of Indwe and Cyphergat, having impressions of plants. Unfortunately they had been subjected to barbarous treatment during transit, and I have only been able to make out three. These are ferns, and one cycadaceous plant.

Pecopteris odontopteroides. Morris.
Cycadites pectinoides.
Sphenopteris Murrayana. Nor. Spec.

Diagnosis of the last: Frond dichotomously divided; each division irregularly pinnate; pinnae bi-pinnate, segments linear recurved.

This plant is very different from *Sphenopteris elongata* of Carruthers in being altogether more robust and rigid in habit.

Remarks on the probable horizon of the coal beds:—The coal of these fields is, according to Professor Green, sub-aqueous and not a land or sub-aerial formation like that of the carboniferous age in England. It probably belongs to the Jurassic age. Carruthers has referred one coal field with similar fossils, of Queensland, to that age; and the other coal field to the carboniferous age as having fossil remains similar to those of the true carboniferous horizon. Professor Owen has come to the same conclusion from examination of the reptilian remains of these Upper Karroo coal-bearing beds.

The old idea that coal was confined to the carboniferous age has long been exploded: it has been found in many ages. As has been

stated, there is workable coal in Queensland in two horizons. The coal-fields of Virginia are of Triassic age. Workable coal is found in Queensland of the Miocene period. As far as we know the greatest development of the mineral called coal is in connection with rocks of the carboniferous period. The view that there must have been a greater amount of carbonic acid (carbon dioxide) in the atmosphere, then, is only held now by imaginative chemists. The presence of carbonic acid gas in the air to any considerable extent would prevent the heat of the sun from penetrating it to the soil.

The absorptive power of the atmosphere as at present constituted is 1,

As compared with that of carbonic acid, which is as much as 972.

A proper knowledge of Elementary Physics would keep such men from views so diametrically opposed to the true spirit of uniformitarianism in geology. There are, as Lyell states, in New Zealand and in Scotland processes going on now which would furnish material for a great coal deposit, and doubtless there have been parts of the globe similarly favoured in all geological ages. It has been observed by geologists that the coal-fields of Britain occur in troughs and hollows protected by volcanic outbursts; and therefore to the upheavals and igneous energy subsequent to the deposits of coal that country owes its possession of great riches in this mineral. In other periods it must have been similarly situated geographically, but on account of the absence of protection by volcanic outbursts the vegetable deposits have been washed away and scattered and dissipated.

The position of the coal-bearing beds of South Africa, which have produced the fossils referred to and described may be graphically represented as follows, taking a diagonal section from Table Bay to the Stormberg:—

Tertiary Deposits.

Meagrely represented by surface gravels, &c.

Mesozoic Rocks.

Cretaceous.—Stormberg and Diamond Fields. Volcanic vents.
Jurassic.—Molteno, Cyphergat, and Indwe. Coal-bearing beds.
Triassic.—Upper Karoo. (Bain).

Palaeozoic Rocks.

Permian.—Lower Karoo (Bain) and Ecca beds (southern slope of the Roggeveld and Kimberley Reef).
Carboniferous.—Witteberg, &c., but without workable coal.
Devonian—Upper.—Warm Bokkeveld.
Devonian—Lower.—Table Mountain Sandstone.
Silurian.—Clay slate of Lion's Rump.